

PART II

PREDICTING WIND EROSION LOSSES

SECTION B

This section will be used for the management method of calculating wind erosion.

Estimating Wind Erosion Using the Management Period Method to Obtain a Weighted Estimate.

The following information is to be used for estimating wind erosion using the management period method. WEQ factors are selected that represent conditions during each identified crop management period. Dates are established for the beginning of the crop production year and the end of each management period. The management period method is appropriate when:

- * Wind erosion estimates are needed for specific periods.
- * A system or practice is being designed to reduce crop damage during susceptible crop growth stages.
- * Factors such as K, L, and/or V change throughout the year.

The crop production year(s) may be divided into as many management periods as appropriate. In Wyoming the following management periods will usually be adequate:

Post-harvest (PH)	From harvest until primary tillage for the next crop or until planting the next crop with no tillage before planting.
Fallow (F)	From primary tillage to secondary tillage for seedbed preparation. (In the case of summer fallow or other systems involving an extended sequence of tillage operations associated with significant changes in residue cover, the fallow period may need to be subdivided into more than one period.)
Seedbed (SB)	From secondary tillage for seedbed preparation and planting until emergence of the new crop.
Establishment (EST)	From crop emergence until cover provided by the new crop is sufficient to prevent wind erosion, approximately 25 percent canopy.
Grow/mature crop (GM)	From time cover provided by the growing crop is sufficient to prevent wind erosion until crop harvest.

The Basic Steps for Using the Management Period Method are as Follows:

1. Establish the management periods with a beginning date for the crop or crop sequence and ending dates for each management period. Table 2, Page B-9, Erosion Prediction, Part II, Section B, lists the approximate days after planting to reach the end of management periods SB and EST.
2. Determine Soil erodibility "I" using Table 2, Page C-3, Erosion Prediction, Part II, Section C. Make any appropriate adjustments to "I" for knolls, surface crusting, clod-forming tillage or irrigation.
3. Determine the pattern ridge roughness "K" for each crop management period from Table 2, Page C-3, Erosion Prediction, Part II, Section C, when actual field conditions are unknown, or from Table 7, Pages C-9 to C-11, Erosion Prediction, Part II, Section C when actual field conditions are known. The prevailing wind erosion direction may change with management period. Thus, a change in the angle of deviation may influence "K" along with changes in ridge height and

spacing. See Figure 1, Page B-15, Erosion Prediction, Part II, Section B, to determine your Erosive Wind Energy (EWE) area. Use Table 5, Pages B-16 to B-26, Erosion Prediction, Part II, Section B, to select an appropriate prevailing wind erosion direction for your location. Make any appropriate adjustments to "K" for random roughness.

4. Select the appropriate climatic factor "C" from Figure 1, Page C-1, Erosion Prediction, Part II, Section C. Use the annual "C" factor for determining all management period erosion rates. Make any appropriate adjustments to "C" for irrigation.
5. Determine the unsheltered distance "L" for each management period. This is a calculated "L" using prevailing wind erosion direction, preponderance, and field length to width ratios.
 - a. Determine the appropriate prevailing wind erosion direction and preponderance from Table 5, Pages B-16 to B-26, Erosion Prediction, Part II, Section B, for each management period at your location.
 - b. Measure the actual length and width of the area being evaluated and determine the ratio of field length to width.
 - c. Determine the angle of deviation between the prevailing wind erosion direction and an imaginary line perpendicular to the long side of the field.
 - d. Using information obtained in "a" through "c" determine the wind erosion direction factor from Table 1, Pages B-4, B-5, B-6, B-7, or B-8, Erosion Prediction, Part II, Section B.
 - e. Multiply the field width from "b" by the wind erosion direction factor from "d."
 - f. Calculate "L" using this method for each management period.
 - g. Credit wind barriers present by subtracting 10H from the calculated L.
6. Estimate the kind, amount, and orientation of the residue and/or growing crop for each management period.
7. Convert the values recorded in step 6 to flat small grain equivalents (SGe) using Chart 1, Pages D-2 to D-29, Erosion Prediction, Part II, Section D, appendix. When both previous crop residue and a growing crop are present, use the following procedure to determine SGe.
 - a. Estimate the air dry pounds of previous crop residue using Table 8, Page C-12, Table 9, Page C-14, and Table 10, Page C-15 to C-18, Erosion Prediction, Part II, Section C.
 - b. Estimate the air dry pounds of growing crop.
 - c. Add the pounds of residue and pounds of growing crop for total biomass present and calculate the percent of each component.
 - d. Use the total pounds from "c" and read the SGe from the appropriate (SGe) using Chart 1, Pages D-2 to D-29, Erosion Prediction, Part II, Section D, appendix, for each component.
 - e. Multiply the pounds SGe from "d" by the appropriate percentage from "c."

- f. Add the results from "e" for the SGe for that management period.
8. Use the appropriate "E" table for the selected "I", "K", "C", "L", and "V" to determine an annual soil erosion rate for each management period.
9. From Table 5, Pages B-16 to B-26, Erosion Prediction, Part II, Section B, select the appropriate Erosive Wind Energy (EWE) Distribution Curve and determine the percent EWE for each crop management period date. Calculate the percent EWE that occurs during each management period.
10. For each management period multiply "E" by percent EWE. This is the estimated wind erosion (tons/acre) for each management period. The sum of these values for a single year is the annual wind erosion rate in tons/acre/year. The sum of these values for a crop sequence divided by the number of years in the sequence is the average annual wind erosion rate in tons/acre/year for the crop sequence.
11. Guidelines for Estimating Wind Erosion
- For high and medium residue crops (such as small grains, corn for grain, etc., the standing stubble during crop management period PH usually provides complete protection from wind erosion. Handle this period in the same manner, unless there is fall tillage.
- For some low residue crops (such as soybeans, corn silage, sunflowers), crop management period PH may be subject to wind erosion. Using the worksheet, estimate potential soil loss for period PH when standing stubble does not provide complete protection.
12. Use the blank form located in the appendix to estimate wind erosion using the management period method.

Soil And Crop Tolerances to Wind Erosion

Soil loss tolerances to protect the soil resource have been assigned to all soil series. These can be found on NRCS soil interpretation records and other interpretive tables.

Wind erosion may also cause physical damage to growing crops. Crop tolerances to abrasion are usually less than soil loss tolerance. Estimated tolerances of several common crops to wind erosion during the seedling stage are shown in Table 4, Page B-14, Erosion Prediction, Part II, Section B. When crop damage is a major concern, the wind erosion control system should be designed to reduce wind erosion below the crop tolerance level during the seedling period of the affected crop. To estimate wind erosion during the seedling period, use the Crop Management period method.

Erosive Wind Energy (EWE) Distribution

Figure 1, Page B-15, Erosion Prediction, Part II, Section B, is a map showing the EWE areas for the state. Table 5, Pages B-16 to B-26 are tables showing the percent of the erosive wind energy that occurs every two weeks.

TABLE 1
WIND EROSION DIRECTION FACTOR

ANGLE OF DEVIATION * = 0°							
FIELD LENGTH/WIDTH RATIO							
Preponderance	1:1	2:1	4:1	8:1	10:1	12:1	16:1
1.0	1.03	1.46	1.70	1.85	1.88	1.90	1.95
1.2	1.03	1.30	1.45	1.53	1.56	1.58	1.62
1.4	1.03	1.20	1.28	1.32	1.35	1.37	1.40
1.6	1.03	1.14	1.18	1.20	1.22	1.23	1.25
1.8	1.03	1.10	1.11	1.12	1.13	1.14	1.15
2.0	1.02	1.07	1.07	1.07	1.08	1.08	1.08
2.2	1.02	1.05	1.05	1.05	1.05	1.05	1.05
2.4	1.02	1.04	1.04	1.04	1.04	1.04	1.04
2.6	1.01	1.03	1.03	1.03	1.03	1.03	1.03
2.8	1.01	1.02	1.02	1.02	1.02	1.02	1.02
3.0	1.01	1.02	1.02	1.02	1.02	1.02	1.02
3.2	1.01	1.01	1.01	1.01	1.01	1.01	1.01
3.4	1.01	1.01	1.01	1.01	1.01	1.01	1.01
3.6	1.00	1.01	1.01	1.01	1.01	1.01	1.01
3.8	1.00	1.01	1.01	1.01	1.01	1.01	1.01
4.0	1.00	1.01	1.01	1.01	1.01	1.01	1.01

* Angle of deviation is the difference between prevailing wind erosion direction and perpendicular to the long side of the field or strip (0° is perpendicular to the long side). Multiply the Wind Erosion Direction Factor times the width of the field for "L" distance.

TABLE 1 (Cont.)

WIND EROSION DIRECTION FACTOR

ANGLE Of DEVIATION * = 22.5°							
FIELD LENGTH/WIDTH RATIO							
Preponderance	1:1	2:1	4:1	8:1	10:1	12:1	16:1
1.0	1.03	1.46	1.70	1.85	1.88	1.90	1.95
1.2	1.03	1.37	1.50	1.61	1.64	1.66	1.70
1.4	1.03	1.27	1.36	1.44	1.46	1.47	1.50
1.6	1.03	1.22	1.26	1.30	1.32	1.33	1.35
1.8	1.03	1.18	1.20	1.21	1.22	1.23	1.24
2.0	1.04	1.16	1.16	1.16	1.16	1.16	1.17
2.2	1.05	1.14	1.14	1.14	1.14	1.14	1.14
2.4	1.06	1.13	1.13	1.13	1.13	1.13	1.13
2.6	1.06	1.13	1.13	1.13	1.13	1.13	1.13
2.8	1.07	1.12	1.12	1.12	1.12	1.12	1.12
3.0	1.07	1.12	1.12	1.12	1.12	1.12	1.12
3.2	1.07	1.12	1.12	1.12	1.12	1.12	1.12
3.4	1.08	1.12	1.12	1.12	1.12	1.12	1.12
3.6	1.08	1.11	1.11	1.11	1.11	1.11	1.11
3.8	1.08	1.11	1.11	1.11	1.11	1.11	1.11
4.0	1.08	1.11	1.11	1.11	1.11	1.11	1.11

* Angle of deviation is the difference between prevailing wind erosion direction and perpendicular to the long side of the field or strip (0° is perpendicular to the long side). Multiply the Wind Erosion Direction Factor times the width of the field for "L" distance.

TABLE 1 (Cont.)

WIND EROSION DIRECTION FACTOR

ANGLE OF DEVIATION * = 45°							
FIELD LENGTH/WIDTH RATIO							
Preponderance	1:1	2:1	4:1	8:1	10:1	12:1	16:1
1.0	1.03	1.46	1.70	1.85	1.88	1.90	1.95
1.2	1.03	1.44	1.63	1.72	1.75	1.77	1.81
1.4	1.03	1.42	1.57	1.62	1.65	1.67	1.70
1.6	1.03	1.42	1.52	1.55	1.57	1.58	1.61
1.8	1.03	1.42	1.49	1.51	1.52	1.53	1.55
2.0	1.03	1.42	1.48	1.49	1.49	1.49	1.50
2.2	1.02	1.42	1.48	1.48	1.48	1.48	1.48
2.4	1.02	1.42	1.48	1.48	1.48	1.48	1.48
2.6	1.01	1.42	1.48	1.48	1.48	1.48	1.48
2.8	1.01	1.42	1.48	1.48	1.48	1.48	1.48
3.0	1.01	1.42	1.48	1.48	1.48	1.48	1.48
3.2	1.01	1.42	1.48	1.48	1.48	1.48	1.48
3.4	1.01	1.42	1.48	1.48	1.48	1.48	1.48
3.6	1.01	1.42	1.48	1.48	1.48	1.48	1.48
3.8	1.01	1.42	1.48	1.48	1.48	1.48	1.48
4.0	1.01	1.42	1.48	1.48	1.48	1.48	1.48

* Angle of deviation is the difference between prevailing wind erosion direction and perpendicular to the long side of the field or strip (0° is perpendicular to the long side). Multiply the Wind Erosion Direction Factor times the width of the field for "L" distance.

TABLE 1 (Cont.)

WIND EROSION DIRECTION FACTOR

ANGLE OF DEVIATION * = 67.5°							
FIELD LENGTH/WIDTH RATIO							
Preponderance	1:1	2:1	4:1	8:1	10:1	12:1	16:1
1.0	1.03	1.46	1.70	1.85	1.88	1.90	1.90
1.2	1.03	1.49	1.80	1.94	1.98	2.00	2.04
1.4	1.03	1.52	1.90	2.03	2.07	2.08	2.12
1.6	1.03	1.55	1.98	2.13	2.15	2.16	2.20
1.8	1.03	1.58	2.08	2.23	2.25	2.26	2.30
2.0	1.04	1.62	2.17	2.35	2.36	2.37	2.40
2.2	1.05	1.65	2.27	2.48	2.49	2.49	2.50
2.4	1.06	1.68	2.37	2.61	2.61	2.61	2.61
2.6	1.06	1.71	2.42	2.71	2.71	2.71	2.71
2.8	1.07	1.72	2.44	2.77	2.77	2.77	2.77
3.0	1.07	1.73	2.45	2.82	2.82	2.82	2.82
3.2	1.07	1.74	2.46	2.85	2.85	2.85	2.85
3.4	1.07	1.75	2.47	2.87	2.87	2.87	2.87
3.6	1.08	1.75	2.48	2.89	2.89	2.89	2.89
3.8	1.08	1.76	2.48	2.90	2.90	2.90	2.90
4.0	1.08	1.76	2.49	2.91	2.91	2.91	2.91

* Angle of deviation is the difference between prevailing wind erosion direction and perpendicular to the long side of the field or strip (0° is perpendicular to the long side). Multiply the Wind Erosion Direction Factor times the width of the field for "L" distance.

TABLE 1 (Cont.)

WIND EROSION DIRECTION FACTOR

ANGLE OF DEVIATION * = 90°							
FIELD LENGTH/WIDTH RATIO							
Preponderance	1:1	2:1	4:1	8:1	10:1	12:1	16:1
1.0	1.03	1.46	1.70	1.85	1.88	1.90	1.95
1.2	1.03	1.50	1.90	2.10	2.16	2.23	2.32
1.4	1.03	1.55	2.10	2.40	2.50	2.60	2.75
1.6	1.03	1.66	2.30	2.70	2.87	3.00	3.25
1.8	1.03	1.80	2.55	3.10	3.32	3.50	3.85
2.0	1.02	1.96	2.78	3.50	3.84	4.08	4.56
2.2	1.02	2.00	3.06	4.05	4.47	4.80	5.40
2.4	1.02	2.00	3.35	4.63	5.12	5.60	6.40
2.6	1.01	2.00	3.56	5.30	5.93	6.50	7.60
2.8	1.01	2.00	3.74	5.85	6.64	7.50	8.90
3.0	1.01	2.00	3.92	6.51	7.60	8.80	10.60
3.2	1.01	2.00	4.00	6.89	8.20	9.30	11.50
3.4	1.01	2.00	4.00	7.08	8.40	9.60	11.80
3.6	1.00	2.00	4.00	7.26	8.60	9.90	12.30
3.8	1.00	2.00	4.00	7.45	8.91	10.30	12.80
4.0	1.00	2.00	4.00	7.64	9.20	10.60	13.30

* Angle of deviation is the difference between prevailing wind erosion direction and perpendicular to the long side of the field or strip (0° is perpendicular to the long side). Multiply the Wind Erosion Direction Factor times the width of the field for "L" distance.

CIRCULAR FIELDS

Unsheltered distance "L" is equal to 1.83 times the radius of the field or 0.915 times the diameter of the field regardless of the direction or preponderance.

TABLE 2 ^{1/}

CROP DEVELOPMENT INTERVALS

Crop	Days From Planting to % Canopy		
	25%	50%	75%
Alfalfa, spring planted	42	55	75
Alfalfa, late summer planted	45	60	305
Buckwheat	45	55	70
Corn	40	50	70
Flax	50	65	75
Millet	28	35	45
Mustard	40	50	60
Potatoes	35	45	65
Sorghum	40	50	70
Soybeans	40	50	70
Spring Grain	40	50	60
Sugar beets	40	50	65
Sunflowers	40	50	70
Winter Grain	35	50	245
Winter Cover Crop	20	35	210

- 1/ This table is used to determine the number of days from planting to reach a certain percent canopy for that crop. This information will be used in the management method of computing wind erosion.

TABLE 3
WYOMING CROP GROWTH CURVES

CORN		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	2
15	7	4
22	15	11
30	22	59
37	30	259
45	37	918
52	45	1839
60	52	2560
67	60	3326

WINTER WHEAT		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	19
15	7	41
22	15	62
30	22	33
37	30	204
45	37	344
52	45	483
60	52	481
67	60	478

TABLE 3 (Cont.)
WYOMING CROP GROWTH CURVES

SPRING WHEAT		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	19
15	7	41
22	15	136
30	22	334
37	30	724
45	37	1173
52	45	1753
60	52	2257
67	60	2840

SUNFLOWERS		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	1
15	7	2
22	15	7
30	22	25
37	30	134
45	37	473
52	45	1183
60	52	1848
67	60	2547

TABLE 3 (Cont.)
WYOMING CROP GROWTH CURVES

SUGAR BEETS		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	5
15	7	40
30	15	120
45	30	400
60	45	680
75	60	1500
90	75	3250
105	90	4150
120	105	4650
135	120	4700

EDIBLE BEANS <u>1/</u>		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	0
15	7	75
30	15	125
45	30	250
60	45	500
75	60	750
90	75	1000
105	90	2000
120	105	2000

1/ - Estimates only. Growth curves will be modified pending collection of field data.

TABLE 3 (Cont.)
WYOMING CROP GROWTH CURVES

NEW SPRING SEEDED ALFALFA		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
7	1	0
15	7	100
30	15	200
45	30	300
60	45	400
75	60	500
90	75	700
105	90	800
120	105	1000
135	120	1150
150	135	1550

ESTABLISHED ALFALFA ^{1/}		
Days After Planting	Days After Emergence	Biomass Dry Weight (lbs.)
NA	1	945
NA	7	2205
NA	15	5040
NA	30	7140
NA	45	6615
NA	60	5355
NA	Harvest Hay	1000
NA	90	1000
NA	105	3045
NA	120	3045
NA	135	3045

^{1/} - For mature alfalfa, assume a minimum of 1,000 pounds of dry matter at all times.

TABLE 4 ^{1/}

CROP TOLERANCE LEVELS

Crop	Estimated Crop Tolerance
Barley	2/
Buckwheat	2/
Corn	2.0
Irish Potatoes	1.0
Lima Beans	0.5
Oats	2/
Rye	2/
Snap Beans	0.5
Sorghum	2.0
Soybeans	1.0
Sugar beets	1.0
Sunflowers	2.0
Sweet Corn	2.0
Wheat	2/

1/ Crop tolerance values are expressed as Tons/Acre/Year.

2/ Will probably tolerate soil blowing equal to or greater than the tolerable soil loss.

3/ The figures in this table are only an indication of the amount of soil loss that the crop can withstand and not have any damage occurring to it.

FIGURE 1

WYOMING EROSION WIND ENERGY (EWE) AREAS

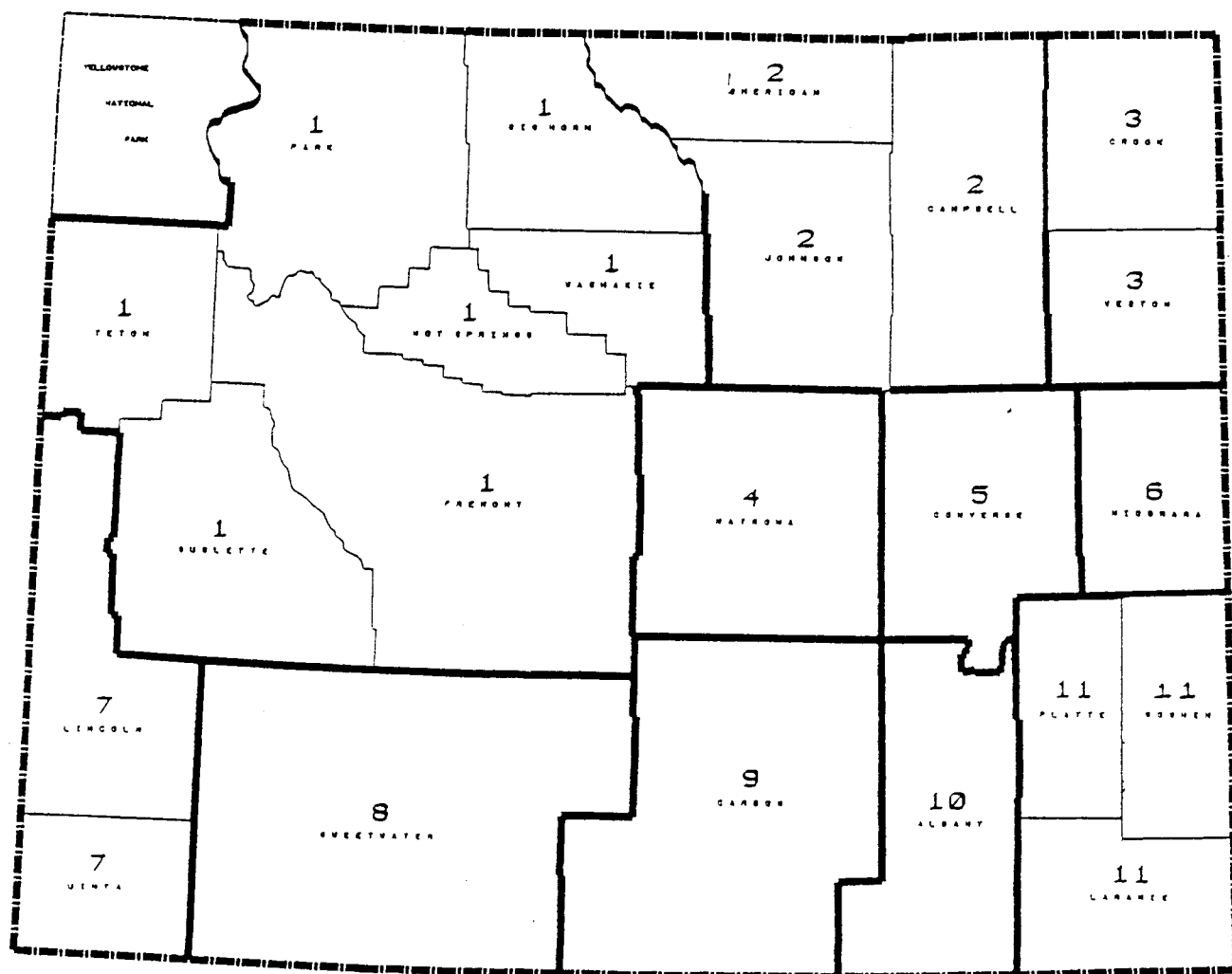


TABLE 5
EWE – AREA 1

**PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES**

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	21.1	2.3	13.7	13.6	8.5	8.9	5.4	5.4	7.3	2.6	1.2	10.0
Day 1 – 15	10.6	1.2	6.9	6.8	4.3	4.5	2.7	2.7	3.7	1.3	0.6	5.0
Day 16 – 30	10.5	1.1	6.8	6.8	4.2	4.4	2.7	2.7	3.6	1.3	0.6	5.0
Direction 1/	270	203	247	247	270	247	247	247	247	270	247	247
Preponderance	5.3	1.9	2.9	2.6	2.7	2.5	2.2	1.9	2.6	2.6	3.0	11.8

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Lander, Wyoming climate station.

EWE Area 1 includes the following counties:

Fremont
Sublette
Teton

TABLE 5

EWE – AREA 1A

**PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES**

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	20.1	17.3	9.1	7.1	4.0	2.2	1.1	1.0	2.8	6.2	10.2	18.9
Day 1 – 15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Day 16 – 30												
Direction 1/ Preponderance	247	247	292	315	292	292	315	315	292	315	270	247

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Billings, Montana climate station.

EWE Area 1A includes the following counties:

Big Horn
Hot Springs
Park
Washakie

TABLE 5
EWE - AREA 2

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	7.0	3.4	12.2	18.7	20.9	5.8	3.0	3.7	7.7	7.0	2.1	8.6
Day 1 - 15	3.5	1.7	6.1	9.4	10.5	2.9	1.5	1.9	3.9	3.5	1.1	4.3
Day 16 - 30	3.5	1.7	6.1	9.3	10.4	2.9	1.5	1.8	3.8	3.5	1.0	4.3
Direction 1/ Preponderance	270 1.5	315 5.3	315 3.2	315 7.1	315 5.3	315 4.0	315 4.7	315 4.4	315 7.3	315 4.1	315 5.4	315 1.4

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Sheridan, Wyoming climate station.

EWE Area 2 includes the following counties:

Campbell Johnson Sheridan

TABLE 5
EWE - AREA 3

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	11.0	10.2	16.0	12.8	6.7	3.0	2.2	3.0	4.8	5.8	12.7	11.8
Day 1 - 15	5.5	5.1	8.0	6.4	3.4	1.5	1.1	1.5	2.4	2.9	6.4	5.9
Day 16 - 30	5.5	5.1	8.0	6.4	3.3	1.5	1.1	1.5	2.4	2.9	6.3	5.9
Direction 1/ Preponderance	337 5.3	337 5.3	337 7.7	337 4.7	337 3.2	337 4.4	337 5.2	337 3.7	337 5.3	337 5.1	337 6.3	337 4.1

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Rapid City, South Dakota climate station.

EWE Area 3 includes the following counties:

Crook **Weston**

TABLE 5
EWE - AREA 4

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	23.6	11.9	11.3	6.7	3.7	2.4	1.4	1.8	2.8	4.6	9.4	20.4
Day 1 - 15	11.8	6.0	5.7	3.4	1.9	1.2	0.7	0.9	1.4	2.3	4.7	10.2
Day 16 - 30	11.8	5.9	5.6	3.3	1.8	1.2	0.7	0.9	1.4	2.3	4.7	10.2
Direction 1/ Preponderance	225 3.7	225 4.4	225 2.6	247 2.3	247 2.0	247 1.8	247 1.8	247 2.3	225 2.3	225 3.5	225 4.0	225 5.0

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Casper, Wyoming climate station.

EWE Area 4 includes the following counties:

Natrona

TABLE 5
EWE - AREA 5

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	21.4	16.5	11.3	9.0	7.0	4.6	2.4	2.5	2.8	4.0	7.1	11.4
Day 1 - 15	10.7	8.3	5.7	4.5	3.5	2.3	1.2	1.3	1.4	2.0	3.6	5.7
Day 16 - 30	10.7	8.2	5.6	4.5	3.5	2.3	1.2	1.2	1.4	2.0	3.5	5.7
Direction 1/ Preponderance	247 5.0	247 7.2	247 2.6	270 1.8	270 2.3	247 2.3	113 2.5	113 1.7	292 2.2	247 3.2	247 3.3	247 6.5

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Douglas, Wyoming climate station.

EWE Area 5 includes the following counties:

Converse

TABLE 5
EWE - AREA 6

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	5.1	5.4	13.1	17.4	10.5	5.9	6.9	7.5	6.9	6.7	9.1	5.4
Day 1 - 15	2.6	2.7	6.6	8.7	5.3	3.0	3.5	3.8	3.5	3.4	4.6	2.7
Day 16 - 30	2.5	2.7	6.5	8.7	5.2	2.9	3.4	3.7	3.4	3.3	4.5	2.7
Direction 1/ Preponderance	315 2.2	45 1.4	315 2.9	157 2.5	157 2.7	180 2.7	180 2.9	180 3.9	180 3.0	180 2.4	157 2.5	315 2.6

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 130° South, 270° West. Wind direction and preponderance from the Scottsbluff, Nebraska climate station.

EWE Area 6 includes the following counties:

Niobrara

TABLE 5
EWE - AREA 7

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	16.4	15.4	14.4	8.3	4.8	6.4	3.8	2.8	3.8	5.2	8.9	10.0
Day 1 - 15	8.2	7.7	7.2	4.2	2.4	3.2	1.9	1.4	1.9	2.6	4.5	5.0
Day 16 - 30	8.2	7.7	7.2	4.1	2.3	3.2	1.9	1.4	1.9	2.6	4.4	5.0
Direction 1/ Preponderance	247 6.2	247 5.5	247 4.2	270 3.3	270 2.6	270 2.7	247 3.0	247 2.4	270 2.2	247 3.0	270 4.0	247 4.9

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Ft. Bridger, Wyoming climate station.

EWE Area 7 includes the following counties:

Lincoln Uinta

TABLE 5
EWE - AREA 8

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	18.6	11.6	12.2	11.1	8.1	4.6	2.1	2.4	3.8	4.5	6.8	14.1
Day 1 - 15	9.3	5.8	6.1	5.6	4.1	2.3	1.1	1.2	1.9	2.3	3.4	7.1
Day 16 - 30	9.3	5.8	6.1	5.5	4.0	2.3	1.0	1.2	1.9	2.2	3.4	7.0
Direction 1/ Preponderance	270 4.4	270 4.7	270 2.5	247 2.1	247 2.0	270 1.6	270 1.4	270 2.3	247 1.9	270 2.3	270 4.4	270 4.4

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Rock Springs, Wyoming climate station.

EWE Area 8 includes the following counties:

Sweetwater

TABLE 5
EWE - AREA 9

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	13.6	13.9	13.9	9.3	5.0	3.4	1.6	1.8	3.5	3.9	11.7	18.5
Day 1 - 15	6.8	7.0	7.0	4.7	2.5	1.7	0.8	0.9	1.8	2.0	5.9	9.3
Day 16 - 30	6.8	6.9	6.9	4.6	2.5	1.7	0.8	0.9	1.7	1.9	5.8	9.2
Direction 1/ Preponderance	247 3.8	247 3.9	247 4.4	247 2.7	247 2.5	247 2.0	247 1.6	247 3.0	247 2.5	247 2.9	247 3.6	247 4.6

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Rawlins Wyoming climate station.

EWE Area 9 includes the following counties:

Carbon

TABLE 5
EWE - AREA 10

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	20.9	16.2	11.0	8.8	6.6	5.6	1.8	1.1	1.7	3.4	9.8	13.1
Day 1 - 15	10.5	8.1	5.5	4.4	3.3	2.8	0.9	0.6	0.9	1.7	4.9	6.6
Day 16 - 30	10.4	8.1	5.5	4.4	3.3	2.8	0.9	0.5	0.8	1.7	4.9	6.5
Direction 1/ Preponderance	270 1.4	247 2.3	292 1.9	292 2.1	292 1.6	135 1.4	135 1.4	270 1.6		270 1.5	270 2.8	270 2.6

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Laramie, Wyoming climate station.

EWE Area 10 includes the following counties:

Albany

TABLE 5
EWE - AREA 11

PREVAILING WIND DIRECTION, PREPONDERANCE OF WIND EROSION
FORCES IN THE PREVAILING WIND DIRECTION, AND BI-MONTHLY EWE FIGURES

Location & Item	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly	18.5	13.7	16.0	11.3	5.4	2.0	0.7	0.9	1.9	4.2	8.9	16.4
Day 1 - 15	9.3	6.9	8.0	5.7	2.7	1.0	0.4	0.5	1.0	2.1	4.5	8.2
Day 16 - 30	9.2	6.8	8.0	5.6	2.7	1.0	0.3	0.4	0.9	2.1	4.4	8.2
Direction 1/ Preponderance	292 4.0	292 2.9	315 2.2	315 2.4	315 2.3	293 2.1	0 1.6	337 2.0	293 2.1	315 2.0	292 2.8	292 3.7

Instructions: Select the wind direction and preponderance for the crop stage period desired.

1/ Wind direction is in degrees with 0° North, 90° East, 180° South, 270° West. Wind direction and preponderance from the Cheyenne, Wyoming climate station.

EWE Area 11 includes the following counties:

Laramie Platte Goshen